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ABSTRACT

A test battery termed "Assessment of Reading and Language Maturity" (ALARM) contains 15 subtests designed to cover the major and minor elements involved in assessing and promoting progress toward reading-language-thinking and social-emotional maturity. Although still undergoing development, ALARM has been administered to and partially normed on over 800 urban and suburban youngsters between grades 6 and 14. Tests 1 through 3 attempt to establish if the student has achieved basic literacy. Test 4 covers syntactic complexity, test 5 is a modified cloze, and test 6 assesses reading comprehension. Tests 7 and 8, testing speed and accuracy in content area material and abstract verbal reasoning, require more complex mental operations and the integration of specialized areas of prior knowledge while reading. Tests 9 through 12 test even more subtle factors: elaborative thinking, socio-emotional factors, teaching/learning range, and cultural compatability. Tests 13 through 15, assessing critical judgments in the areas of useful information, reasonability, and comprehension and aesthetics, measure both comprehension and evaluative thinking. A preliminary factor analysis of the 15 subtests revealed 4 factors: developmental reading, major bracing elements, complementary elements, and trace elements. Although not fully satisfactory, ALARM appears to offer a paradigm for constructing profiles of reading-language-thinking and social-emotional development at post-elementary levels. (JL)

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Description and Factor Analysis of A Broad Spectrum Battery for Assessing 'Progress toward Reading Maturity'

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Description and Factor Analysis of A Broad Spectrum Battery for Assessing 'Progress toward Reading Maturity'

Assessing progress in reading becomes increasingly difficult beyond the primary grades as the shift occurs from learning to read to reading to learning. The latter process involves apprehension, comprehension, application and evaluation. Further, the facts and ideas acquired are expected to enhance intellectual, social, and emotional development.

The complexity of the process and the outcomes expected increase the areas in which dysfunctions, or anomalies might occur. These areas are conveniently, though not exclusively, categorized under Barrett's taxonomony of affective and cognitive factors involved in reading comprehension (Barrett, 1968), and under the "4D's" diagnostic models suggested by Weiner and Cromer (1967). Oddly, however, in the 10 plus years since the publications of these works, assessment strategies have remained primarily reading specific at the post-elementary levels, even while terms such as psycholinguistics, and psychoeducational have been popularized. In short, there is no broad spectrum battery of tests and inventories available, in any form, of the major and minor elements held to be involved in assessing and promoting progress toward reading-language-thinking and social-emotional maturity.

Reported here is a brief account of an effort to synthesize such a battery. The battery called ALARM, for 'Assessment of Reading and Language Maturity,' contains 15 subtests (Manzo and Casale, 1979). It is a skeletal, "homemade" and crude set of instruments as compared with distantly analogous commerical batteries and tests. The battery was fashioned initially as operational instrumentation for an even more ambitious research effort; namely, to refine and update the work of Gray and Rogers (1956), and Early (1960), among others, in defining, assessing and promoting "reading maturity," or 'Progress Toward Reading Maturity.' (PTRM), our

call name for the current effort (Manzo and Casale, 1981).

While the larger, and more protracted effort continues, now into longitudinal studies, it seemed appropriate to provide an intermediate report on the instrumentation which has been employed (and continues to be refined and revised) for those who might wish to employ these, or any portions or formulations within them, in their own research or field project activities.

The battery has been employed, now, in several studies, with several hundreds of students. It also has served as an effective vehicle to demonstrate the need for a more holistic approach to reading assessment and instruction in teacher training.

This paper describes the instruments, provides brief comments upon their rational and cognate factors, and includes an accounting of some of the preliminary indications of central tendency, reliability, and of factor analytic structure.

The battery, along with more elaborate and specific data accounts, and machine and hand scoring protocols, is available upon request from the authors, at no charge, to non-commercial users.

The ALARM Battery

The battery has been administered and partially normed on over 800 urban and suburban youngsters between grades 6 and 14. The tests were designed to permit group administration. The full battery requires approximately two and a quarter hours. Three subtests essentially are criterion-referenced, one is a timed test, the remainder are power tests. Administration typically requires three 50 minute sessions.

Profiles are generated by converting raw scores into T-scores with a mean of 50 and a standard deviation of 10. The T-score formula, where x is a given student's raw score, and $\bar{x}$ is the group mean, and S is the group standard deviation, is as follows:

$$T = \frac{x - \bar{x}}{S} \times 10 + 50$$

An intangible, though primary consideration in the design of the tests was that they should be interesting, if not compelling. Inquiries of youngsters who had taken the tests, along with unsolicited comments suggest that this objective was achieved. Inspection of scoring sheets and protocols lent further credibility to this conclusion. There was very little indication of indifference as might be reflected in blocks of unanswered questions or in random patterns of responding. There also were few visible signs of test anxiety. In fact, youngsters seemed to have a sincere desire to just talk about the test and their reflections and experiences with it.

The Experimental Battery

Tests 1 - 3 attempt to establish if the student has achieved basic literacy. These are essentially "criterion referenced" tests. The tests correlate moderately (.40's) with the roughly comparable Iowa Tests of Basic Skills despite their brevity and the ceiling effects associated with their criterion-referenced nature.

Test 1: (Basic) Word Recognition: a word opposites test made up of words with regular and irregular elements (10 items).

Sample items:
A. black: 1. red 2. whole 3. blue 4. green 5. white
B. sweat: 1. dry 2. bitter 3. neat 4. nit 5. score

Test 2: (Basic) Vocabulary: a word similarities test of high frequency words which should be known by the junior high school level (10 items).

Sample items:
A. congress: 1. President 2. parliament 3. board 4. color 5. Washington
B. nimble: 1. dumb 2. numb 3. agile 4. gifted 5. negative

Test 3: (Basic) Analogies: a word reasoning test which requires selecting a word or phrase to complete an analogy. Vocabulary is controlled and estimated at 5th reader level (10 items).

Sample items:
A. Shelves are to books, as cartons are to
1. floors 2. ceilings 3. eggs 4. pickles 5. boxes
B. Eight is to ten as thirteen is to
1. eighteen 2. twelve 3. fifteen 4. zero 5. five

Subtests 4 through 6 also are relatively conventional measures of reading,

though slightly more demanding. These correlate in a range between .48 and .63 with roughly comparable Iowa tests.

Test 4: Syntatic Complexity: students are required to translate briefly, a syntactically complex, though semantically simple, sentence into component parts (7 items).

Sentence:

About the palace the curious citizens watch, through the iron-grilled fence, the merchants with gold-covered purses walking in the courtyard with an air of their importance.

A. "about the palace" means:
   1. around the palace
   2. the merchants are talking about the palace
   3. there will be a bout, or fight, at the palace
   4. where the merchants are going

B. "Ernest has been her favorite" is the same as:
   1. Her favorite had been Ernest
   2. Ernest had been favorite
   3. Her Ernest had been favorite
   4. Favored had been her Ernest

Test 5: Modified Cloze: a further measure of language, though of even more subtle redundancy patterns found in prose. Deletions are on a non-fixed schedule ranging between 3 and 9 words, to reduce the negative emotional impact associated with fixed, arbitrary deletions (25 items).

Sample items:

There (56) are / were many tests in which the Indian boy had to

(57) show / know that he could bear pain.

Test 6: Reading Comprehension: students read two relatively brief, high interest passages, which are followed by an array of multiple choice questions of a main idea, detail, and inferential nature (15 items).

Tests 7 - 8 require more complex mental operations and the integration of specialized areas of prior knowledge while reading.

Test 7: Speed and Accuracy in Content Area Material: a measure of rate of content area reading performance, students are required to rapidly process the best answer to questions designed to tap a diverse pool of commonly held information (33 items).

Sample items:

A. Each of these men was first a Vice-President, except:
   1. Lyndon Johnson
   2. Gerald Ford
   3. Richard Nixon
   4. John Kennedy

B. The "Golden Age" of Greece was about the year:
   1. 7000 B.C.
   2. 500 B.C.
   3. 1500 A.D.
   4. 1800 A.D.

C. Which number cannot be divided evenly by 3?
   1. 16
   2. 15
   3. 18
   4. 36

Test 8: Abstract Verbal Reasoning: students had to decide which of four statements best represented the general idea of a proverb. Reading level and idea load were controlled; emphasis was placed on the students' inclination to think along abstract versus concrete lines: two points were awarded for the most abstract answer, and one point for a correct, concrete answer. The concept base for this test was Gorham's (1956) Proverbs Test (10 items).

Sample items:

A. The squeaking wheel gets the grease.
   1. Silence is best.
   2. The loud child gets the love.
   3. Things attracting attention tend to be taken care of first.
   4. Greased wheels rotate more easily.

B. Clothes make the man.
   1. The way you present yourself is the way you likely will become.
   2. Don't judge a book by its cover.
   3. Clothes and such can make you feel good.
   4. A man is what he is no matter how he dresses.

Tests 9 - 12 are attempts to measure even more subtle factors. In its current skeletal form only subtest 10, Social-Emotional Factors, is significantly correlated to Iowa scholastic measures ($r = .28$). A sub-group index of tests 9 through 12 also is significantly, though at a low level, correlated to the Iowa groupings called Total Language and Total Math. The literature on psychoeducational assessment shows consistently similar findings on such factors. This seems to suggest that the factors measured are present and pervasive, although quantitatively slight.

Test 9: Elaborative Thinking: a brief selection is presented; it is followed by five critiques at varying degrees of sophistication. The student is asked to order these from least to most preferred; points are awarded upon the supposition that preferences for the more sophisticated critiques is suggestive of an inclination to think more "elaboratively".

Examples illustrate three levels of critique of the same passage, which was taken from the book Summerhill.

1. The child is motivated by his natural impulses such as his needs to eat or to gratify wishes. This child naturally comes into conflict with a system of prohibitions called moral instruction. The conflict created by instructing the child in morality is what causes delinquent "bad" children.

2. Children have natural needs. Moral instruction conflicts with natural needs. This contradiction causes delinquent behavior.

3. Neill is correct, moral instruction does conflict with "natural needs": it is supposed to. Moral instruction is man's attempt to control his destiny. Clearly some 'moralists' have over-stated the issue; however, the act of inhibiting certain reactions virtually is a definition of civilization. We don't need less moral instruction, we need more thoughtful instruction.

Test 10: Social-Emotional Factors: students express level of identification with or rejection of 33 animals on a 5 point scale. This group administered test is based upon an adaptation of the Bestiary Inventory (Manzo, 1975a). The SEF subtest has the potential to yield several possible indices of affective factors. The factors surveyed most frequently are general emotional stability and level of appetitive motivation.

This index is derived by taking the scaled responses of each student to 10 animals previously found to have the most positive attributes, summing these, multiplying the sum by two, and then subtracting the simple sum of student identifications with the 10 animals found to have the most negative associations.

Justification for this procedure is derived from studies showing differential levels of empathy for certain animals to be related to academic, social, and emotional state (Manzo, 1975a; Manzo, Lorton, & Condon, 1975; Manzo, 1977; Robinson, 1977; Martin, 1978; Casale, 1981).

Examples:

High positive associations: lion, dove, horse

High negative associations: hog, snake, alligator

Test 11: Teaching/Learning Range: a measure of adaptability, ten methods are described; students express their general level of preference for each on a 5-point scale.

The simple premise of this adaptation of the Learning Preferences Inventory (Manzo, Lorton, & Condon, 1977) is the belief that the broader a student's range, the greater his maturity and adaptability. Several studies have revealed that academic and emotional factors interact with strongly expressed preferences. Thus the information acquired from this subtest can be used in much the same manner as most other cognitive or learning styles inventories as well as a representative measure of adaptability.

Sample items:

Lecture Learning: The teacher does most of the talking. Questions are permitted, but there generally is little discussion.

1. How do you feel about the Lecture Learning method?

Tutoring: The teacher works with one student (or a small group) while the remainder of the class is engaged in another activity.

2. How do you feel about the Tutoring method?

Test 12: Cultural Compatibility: this is a "difference" inventory. It is something, too, of a sociological measure. On a 5-point scale, students express their introspective responses to a range of items selected to represent many of the most fundamental experiences, opportunities, attitudes and values which collectively tend to be assumed to be the composition of the "average" American student, and therefore, around which curriculum and instructional methods are selected and designed.

Theoretically, the ideal student would respond to each item with a 5, indicating that s/he had had, or was having such experiences, and shared such views and attitudes as were expressed. Thus, the higher the score, the higher the degree of "cultural compatibility," and conversely, the lower the score, the less likely that the student would be equal to the assumptions and expectations of school.

Experience with the scale has resulted in a re-evaluation of this assumption and a modification of scoring. A response of 4 is given higher credit than is one of 5. Responses at the 5 level tend to represent, in sum, exaggerations, or compensations.

There are several possible sub-item analyses which potentially can be made within the existing scale, and which likely would be more reliable if the scales are expanded.

Sample items:

1. I like being the way I am.
2. I believe that I will become better at almost everything I do as I grow older.
3. When I become frustrated in school, I double my effort.
4. Some of my relatives have graduated from college.
5. Some members of my family have owned their own businesses.

Tests 13 - 15 are intended to measure both comprehension, in the cosmic sense of apprehension of surrounding facts and experiences, and evaluative thinking, in a variety of situations. The formula for constructing and scoring each of these tests was the same. Fifteen mature readers, holding either masters' degrees or doctorates, were asked to make scaled judgments on a variety of items. They, then, discussed their responses and voted upon a "best" response to each item. There was considerable uniformity of response to over 80% of the items.

Scoring is based upon this formula: three points for "best" response, two points for a choice which is plus or minus one integer from the best choice, no points for judgments beyond that margin. Practically speaking, it would be difficult to get no points with only a possible spread of 5 points; but then this seemed appropriate where personal values were concerned.

Test 13: Critical Judgments - Useful Information: students are asked to judge the "value to society" of information contained in each of several sentences. They are to assume that the information is correct; which, to the best of our knowledge, it is. (18 items)

Examples of Statements:

1. Adolf Hitler once owned 8,960 acres of land in Colorado.
2. Two things cannot occupy the same place at the same time.

Test 14: Critical Judgments - Reasonability: students are asked to judge how "reasonable" they believe each of several sentences to be. (9 items)

Examples of Statements:

1. It is "ok" for parents to hit young children when it appears necessary.
2. Men appear to be more naturally aggressive than women.

Test 15: Critical Judgments -- Comprehensive and Aesthetic: students are asked to make a range of judgments on several matters covered in two previously employed selections from the reading comprehension subtest.

Judgments included some of the type of evaluative thinking required in tests 13 and 14, plus estimations of aesthetic balance - "Does this word or phrase seem balanced: not too flat, nor emotional, nor biased?"; and Logic - "Does this seem logical within the framework of the story?"

Preliminary Data Based Information on Experimental Battery

Preliminary data suggests that the battery, even in this crude skeletal form, may be employed, albeit with reasonable cautions. Reliability estimates for the non-criterion referenced tests are fair to good (with the exception of 'CJ14' for which a new estimate is being calculated based upon a more stable test-retest design).

Table 1

Measures of Central Tendency and Error
on Tests 1 - 15 of ALARM

N = 579 (6th - 9th graders)

Variable	Maximum Value	Mean	Standard Deviation	Reliability Estimate*
1. Word Recognition	10	8.8	1.1	.50
2. Vocabulary	10	6.2	1.4	.29
3. Basic Reasoning	10	6.9	1.9	.58
4. Syntax Complexity	6	4.3	1.4	.49
5. Language Patterns	25	10.4	3.4	.75
6. Rdg. Comprehension	15	8.3	3.3	.75
7. Spd/Accuracy/Content	45	27.6	8.9	.98
8. Abstract Reasoning	30	18.3	7.6	.80
9. Elaborative Thinking	45	26.1	7.2	.83
10. Emotional Factors	70	36.8	12.5	.68
11. Tchg/Lrng Range	62	39.2	7.4	.75
12. Cultural Compat.	286	123.8	47.7	.99
13. CJ - Useful Info.	40	19.7	8.1	.67
14. CJ - Reasonability	23	9.8	4.8	.41
15. CJ - Comprehensive	41	20.7	9.8	.73
TOTAL (ALARM SCORE)	526	377.0	74.3	

*Reliability coefficients for Tests 1-7 derived using Kuder-Richardson formula 20; for tests 8-15 derived using the coefficient alpha formula (Anastasi, 1976).

Factor Structure Battery

A preliminary factor analysis of the 15 subtests revealed essentially four factors. These have tentatively been labeled as a 'Developmental Reading' factor, a 'Major Bracing Elements' factor, a 'Complementary Elements' factor, and a 'Trace Elements' factor.

Insert Table 2 about here

Factor 1, or the 'Developmental Reading' factor is composed of the basic reading/language/thinking axis. The highest loadings were found on verbal abilities such as knowledge of language redundancy patterns in prose, reading comprehension, vocabulary, decoding skills, abstract verbal reasoning, and 'Critical Judgments 13',

(the ability to recognize relevant from irrelevant information). Moderate loadings were found for the social-emotional factors measured (primarily, general stability and appetitive motivation), and for 'Critical judgements 14', (an estimate of apprehension which seems to be analogous to the social comprehension subtest of the WISC IQ test), and, to a considerably lesser degree for 'cultural compatibility' and speed and accuracy in content area reading. The inclination to think 'elaboratively' had a slight negative loading on this essentially typical developmental reading factor. A tentative explanation for this apparent oddity is found ahead in the Discussion section which references similar finding in a moderate term and longitudinal study by Casale and Heath respectively.

Factor 2, or the 'Major Bracing Elements' factor, had its highest loadings on general stability and positive motivation, next upon apprehension, or assessment of the reasonability of certain common conventions, then upon speed and accuracy in content area reading. 'Cultural Compatibility' had a high negative loading. This would seem to suggest then Factor 2 is unrelated to cultural opportunity and life style, but probably more so is related to dominant characterlogical and intellectual traits. This factor, and the next, appear to be involved in the pragmatism-romanticism dichotomy which influences inclinations toward non-fiction - fiction preferences, and related reading-thinking behaviors.

Factor 3, or the 'Complementary Elements' factor clearly is a representation of more subtle intellectual, or cognitive style, factors, i.e., the inclination to think elaboratively, reason intuitively, and to elements of aesthetics and appreciation. This factor seems to be relatively independent of intelligence, general academic achievement, emotional stability or cultural opportunity. While it appears to have relatively little predictive value of conventional measures of intellectual growth and development, logically, it seems as if it could be a significant predictor of long term intellectual growth, and as noted above, tastes in reading as well as other subtle characteristics of reading-thinking behaviors.

Factor 4, or the 'Trace Elements' factor, also appears to be a cognitive, or more particularily, a learning style factor. It loads most heavily upon adaptability, and elements of balanced judgment and aesthetics. It appears to be an indication of ones inclination to accommodate, or change to meet existing demands. It seems to be the converse of petulance and egocentricity. There are slight though pervasive loadings in two areas of citical judgments (involving apprehension and aesthetics), cultural compatability, and to a lesser degree, most other measures of language, rate and knowledge. This factor, as with "trace" (mineral) elements in diet, probably has crucial impact on certain very specific reading and analytical thinking functions, even while it may appear inconsequential in most school-like reading situations.

Discussion

The experimental battery appears to offer a paradigm, if not yet a fully satisfactory battery, for constructing profiles of reading-language-thinking and social-emotional development at the post-elementary levels.

Tests 1-5 offer a quick group assessment roughly comparable to that provided by an Informal Reading Inventory or most standardized tests. The comprehension, language, thinking, and critical judgments subtests seem to parallel Barrett's taxonomy from the Recognition through to the Appreciation levels. The remaining tests appear to provide the complement of information necessary to complete the standards for a Weiner-Cromer work-up, which requires assessment of aspects of possible Defects, Deficiencies, ~~Descriptions~~ Disruptions, and Differences (Weiner-Cromer, 1967).

In covering such a spectrum the experimental battery offers a convenient and cohesive means for studying both normal developmental and anomalous reading-thinking behaviors. Difficulty in isolating anomolous profile states with reading specific tests has masked some potentially important realms of study and treatment.

Employing the battery, along with 54 other cross-verifying instruments and

observations, Casale studied 26, 6th grade students for a year long period. In this way, she was able to identify two particularily illusive anomalous profiles. A simple discrepancy analysis between the "reading specific" and "reading-thinking" subtests isolated three students with very high levels of conventionally measured reading skills (subtests 1-6) and very low levels of critical-evaluative thinking skills (subtests 13-15). Francis Chase, among others, hypothesized the existence of such readers sometime ago, calling them "Higher Illiterates" (Chase, 1956). Similarily, another group of three students were isolated with a converse pattern suggestive of the characteristics often attributed to "Classic Underachievers" (Casale, 1982).

A further case-study type analysis of each of these two sets of subjects revealed several heuristically pregnant similarities and differences between them. Both groups, for example, appeared to have developed their particular reading-thinking patterns as a reaction-formation to analogously unsettling factors in their personal lives. They both were emotionally dependent, and in that sense immature. In general they appeared, as reciprocals often do, as being more alike than different.

The literature is replete with studies comparing weak and strong readers, there is little attention, however, to weak readers with high critical thinking skills, nor to those with solid reading and academic achievement, but who otherwise have social-emotional and/or critical thinking dysfunctions.

A noteable exception to the latter tendency is the finding of David Heath. In a longitudinal study which followed students from their days as college freshmen at Harvard into their 30's, Heath found that "increasing academic aptitude and achievement were associated with increasing interpersonal immaturity..." (Heath, 1977, p 629).

Such findings would seem to suggest that it is necessary to assess and monitor the relationships and patterns of development of students on the broad spectrum explicitly called for in the Weiner-Cromer Diagnostic models, and implicitly

suggested in Barrett's taxonomy. It seems especially important to begin to take regular account of these 'bracing', 'complementary', and 'trace' elements, as we have come to call these, in current research paradigms. In this way, an incidental body of information might be accumulated which either would verify or refute the credibility of these, and other possible, profile distinctions. Profile states surely exist which would be significant predictors of long term progress toward reading-language-thinking and social-emotional maturity. These tend to escape attention, however, with our current highly refined, though narrow, measures of educational progress.

It seems prudent to include the subtests described above (or anologs of these), initially as back-up instrumentation, in current treatment and process studies. This would reduce the risks undertaken by the researcher while accumulating a potentially rich body of qualitatively different information for the next generation of research and development efforts.

Table 2
Factor Structure Matrix
(Oblique Rotation)
For 15 ALARM Subtests

Variable	Factor 1	Factor 2	Factor 3	Factor 4
SYNTC	.80	.19	-.23	.26
M/CLOZE	.76	.32	-.06	.14
CCOMP	.78	-.02	-.05	.20
WR	.53	.21	-.42	.21
VOCAB	.65	.28	-.37	-.09
SPD/ACC	.22	.67	.11	.21
ANALOG	.73	.16	-.15	-.11
ABST/VR	.83	.18	-.01	.19
ELB/THKG	-.10	.04	.76	-.05
SEF	.35	.61	-.38	-.01
TLR	.06	.00	-.06	.82
CULT/C	.25	-.64	.01	.27
CJ1	.79	-.02	.01	.20
CJ2	.33	.57	.24	.47
CJ3	.65	.25	.42	.47

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